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Temperatures and Hugoniots of Nitromethane Detonation Products,* C. S. YOO, N. C. HOLMES, and P. C. SOUERS, Lawrence Livermore National Laboratory - Current thermochemical models for high explosives are largely based on Hugoniots obtained in a pressure-volume space; there is very little constraint on temperatures and kinetics. Therefore, we have measured the shock temperatures of nitromethane at various overdriven states by using a time-resolved optical method at a two-stage gas-gun. Based on these P-T Hugoniot data, we construct the detonation diagram of nitromethane, which consists of no-detonation, super-detonation, normal-detonation zones. In the super-detonation zone between 12 and 19 GPa, the shock-compressed nitromethane detonates with a significant induction time; whereas, the detonation occurs nearly instaneously in the normal-detonation zone above 19 GPa. Considering the *CJ*- pressure of nitromethane being 12.8 GPa, this result signifies the kinetic effect on shock Hugoniots even at overdriven states. For this reason, we have measured the Hugoniot of nitromethane in a stepwise configuration to minimize the kinetic effect less than 0.5 μs. However, the data still show an indication of slow kinetics of nitromethane detonation, particularly near the *CJ*-condition. In this paper, we also compare the results with thermochemical calculations.

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